

**PHERO**Public Health and  
Epidemiology Report Ontario

Volume 14, Number 11

December 31, 2003

**IN THIS ISSUE****NUTRITION AND CANCER PREVENTION**

Cancer Care Ontario

**ENTERIC OUTBREAKS REPORTED IN ONTARIO, 2000-2002**Disease Control Service  
Public Health Branch**Statistics**

• September

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Editorial Board: C. D'Cunha, K. Kurji, G. Kettel,  
E. Chan, H. Brown, R. Jin, B. Gibson, K. Barker  
Editor: Mariam Pingel

The contribution of scientific articles by the staff of local Boards of Health is invited. Address all inquiries and submissions to the Editor.

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ISSN 1181-960X

**Seasons Greetings**

*As 2003 draws to a close, we are provided with the opportunity to reflect upon the milestones of the passing year. The year has presented public health, and the health care system as a whole, with unprecedented changes and challenges.*

*The Public Health Branch became the Public Health Division (PHD) in early 2003, reflecting the growing recognition of public health and the Ministry's commitment to health protection and promotion.*

*Severe Acute Respiratory Syndrome (SARS) tested the strength and capacity of the public health system to address this new and deadly infectious disease. Province-wide, public health professionals worked tirelessly to combat and contain the disease. To help prevent and control outbreaks in the future, the PHD has implemented the SARS Short-Term Action Plan including the creation of an Epi-Centre, Call Centre, and Rapid Mobile Response Teams, and additional support for the health units. In addition, approval has been received to implement the integrated Public Health Information System (iPHIS) in Ontario. iPHIS will provide communicable disease reporting and case management within public health units across the province.*

*We look forward to the new challenges and opportunities that our combined efforts to revitalize public health across Ontario are sure to bring.*

*On behalf of the PHD, I wish you and your loved ones a joyous festive season and all the best in 2004.*

**Colin O. D'Cunha, MBBS, MHSc, FRCPC**  
**Commissioner of Public Health,**  
**Chief Medical Officer of Health and**  
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## BULLETINS and NOTICES



UNIVERSITY  
OF MANITOBA

### CANADA RESEARCH CHAIR IN COMMUNITY ORAL HEALTH

#### ASSISTANT / ASSOCIATE PROFESSOR

The University of Manitoba is seeking applications or nominations for a Canada Research Chair established by the Government of Canada to enable Canadian universities to foster world-class research excellence. The University's Strategic Research Plan includes a Tier II Chair in the Faculty of Dentistry in the area of Community Oral Health, particularly in relation to Aboriginal Populations. The Chair will enhance the University's already established research strength in Aboriginal Health.

Candidates must be established scholars with demonstrated potential of becoming world leaders in their research area. They should have a strong commitment toward interdisciplinary research and the ability to attract excellent graduate students. A Ph.D. and established track record of research in community dentistry and / or Public Health is required. The appointment will be tenure-track at the rank of Assistant or Associate Professor with limited teaching responsibilities. Women and Aboriginal peoples are particularly encouraged to apply.

Aboriginal health is an area of strategic importance to Manitoba and, in turn, to the University. The University's Faculty of Dentistry has targeted for strategic development the area of community oral health, particularly in relation to Aboriginal populations. A Centre for Community Oral Health has recently been created to expand the University's outreach activities in this area, and a recent academic appointment in this area brings unique skills in the analysis of dental health to assess the efficacy of dental health care. The goal of the Centre's research program is to understand the distribution and determinants of oral diseases in special needs populations in order to improve the oral health of native peoples, particularly those living in Manitoba and Northern Canada. Members of the Centre will work closely with the University's oral microbiology and Aboriginal health groups, both of which have established strength at the university. The University of Manitoba encourages applications from qualified women and men, including members of visible minorities, Aboriginal peoples, and persons with disabilities. All qualified candidates are encouraged to apply; however Canadians and permanent residents will be given priority.

PHERO

*With a population of more than 650,000, Winnipeg is a major multicultural centre, including the Royal Winnipeg Ballet, the Winnipeg Symphony Orchestra, the Manitoba Opera Association, the Manitoba Theatre Centre, and also a variety of professional sports activities. Excellent private and public schools are available that teach in English and/or French. Professional baseball, basketball, and hockey teams have their homes in Winnipeg. Superb shopping opportunities are available and it has been said that Winnipeg has the most restaurants per capita of any city in North America. Nearby are some of the finest beaches in Canada along the shores of Lake Winnipeg and our provincial parks offer excellent outdoor recreational opportunities throughout the year. Winnipeg also boasts some of the most affordable housing in Canada and has an international airport within the city limits.*

Review of applications will begin on January 31, 2004 and will continue until the position is filled. Please refer to Position #AGQ 052 in all correspondence. All Chairs are subject to review and final approval by the Canada Research Chair Secretariat. Applications should include a curriculum vita, five-year research plan and three (3) confidential letters of recommendation sent under separate cover by the candidate's referees to:

Dr. Johann de Vries  
Dean and Chair of Search Committee  
Faculty of Dentistry  
D113 - 780 Bannatyne Ave.  
Winnipeg MB Canada R3E 0W2  
email: [devriesj@ms.umanitoba.ca](mailto:devriesj@ms.umanitoba.ca)  
Fax: (204) 789-3912  
Tel: (204) 789-3249

Application materials, including letters of reference, will be handled in accordance with *Freedom of Information and Protection of Privacy Act (Manitoba)*



For details regarding the CRC program, see: <http://www.chairs.gc.ca> and for the University of Manitoba Strategic Research Plan, see: <http://www.umanitoba.ca/vpresearch/ors/researchchairs.htm>

## NUTRITION AND CANCER PREVENTION

### Introduction

*Insight on Cancer* is a unique new series of publications designed to provide up-to-date information for health professionals and policy-makers about cancer and cancer risk factors in the province. It has been developed and supported jointly by Cancer Care Ontario (Division of Preventive Oncology) and the Canadian Cancer Society (Ontario Division).

The following is an extract from the second issue of *Insight on Cancer*, which focuses on results of the Ontario Nutrition and Cancer Prevention Survey (ONCPS). Future planned issues will provide news and information about colorectal cancer and non-Hodgkin lymphoma.

Details about how to access the full issue (and future issues) are found at the end of this extract.

### Setting the context

Unhealthy eating, overweight and physical inactivity may be responsible for 30% of cancers in the developed world.<sup>1</sup> 16,000 cancers in Ontarians could be prevented annually by avoiding these risks. This is comparable to the number preventable by removing manufactured tobacco products.

A diet rich in vegetables and fruit can reduce the risk of colorectal, lung, and a number of other cancers (Table 1).<sup>2</sup>

A healthy body weight reduces the risk of several cancers, including post-menopausal breast cancer.<sup>2</sup> Further, recent research suggests that obesity or overweight may be related to 14% of all male and 20% of all female cancer deaths.<sup>3</sup>

Regular physical activity decreases the risk of some cancers.<sup>2,4</sup> Some benefit results from its role in maintaining healthy body weight, for which moderate intensity is sufficient. Additional cancer-risk reduction may require vigorous activity.<sup>5</sup>

**Table 1.**  
Cancers with convincing or probable evidence for prevention by vegetable and fruit consumption, healthy body weight, and physical activity

Cancer	Vegetables and Fruit	Healthy Body Weight	Physical Activity
Mouth, throat	✓		
Esophagus	✓	✓	
Stomach	✓		
Colon, rectum	✓	✓	✓
Pancreas	✓		
Larynx	✓		
Lung	✓		
Breast		✓	✓
Endometrium*		✓	✓
Prostate		✓	✓
Kidney		✓	
Bladder	✓		

\* Uterus, excluding cervix  
Sources: Institute of Medicine, 2003<sup>2</sup>  
Friedenreich, 2001<sup>5</sup>

Specific recommendations to reduce cancer risk are summarized in Table 2.

**Table 2.**

### Recommendations to reduce cancer risk

	Recommendation
Vegetable and fruit consumption <sup>6</sup>	5–10 servings daily*
Body weight <sup>9,10</sup>	BMI <25 kg/m <sup>2</sup> **
Physical activity <sup>11</sup>	At least 30–45 minutes of moderate to vigorous activity on most days of the week

\* Canada's Food Guide to Healthy Eating describes a serving as 1 medium size vegetable or fruit, 1/2 cup of fresh, frozen or canned vegetables or fruit, 1 cup of salad or 1/2 cup of 100% fruit or vegetable juice<sup>6</sup>

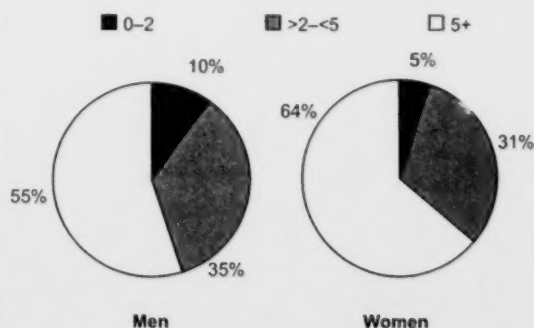
\*\* A measure of body weight (in kilograms) adjusted for height (in metres). Generally categorized as underweight, healthy, overweight or obese

Although there is no evidence that a very low BMI (<18.5) increases the risk of cancer, it is associated with increased risk of other health problems<sup>3</sup> and so is not recommended.

### Vegetables and fruit

Canada's Food Guide to Healthy Eating<sup>6</sup> recommends five to ten servings of vegetables and fruit daily. About 40% of Ontarians surveyed (ages 18–64) failed to meet this recommendation: 45% of men and 36% of women ate fewer than five servings per day (Figure 1). Women ate significantly more vegetables and fruit than men: their median number of daily servings was 6.3, compared to men's 5.4.

**Figure 1. Daily servings of vegetables and fruit**



Source: Cancer Care Ontario, Ontario Nutrition and Cancer Prevention Survey, 2003

### Body Weight

A body mass index (BMI) of less than 25 kg/m<sup>2</sup> is recommended to reduce cancer risk.<sup>2</sup> Although obesity (BMI ≥30) increases risk substantially, any excess weight

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Endometrium*		✓	✓
Prostate		✓	✓
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Bladder	✓		

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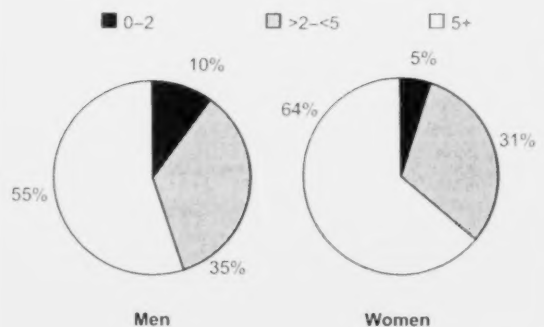
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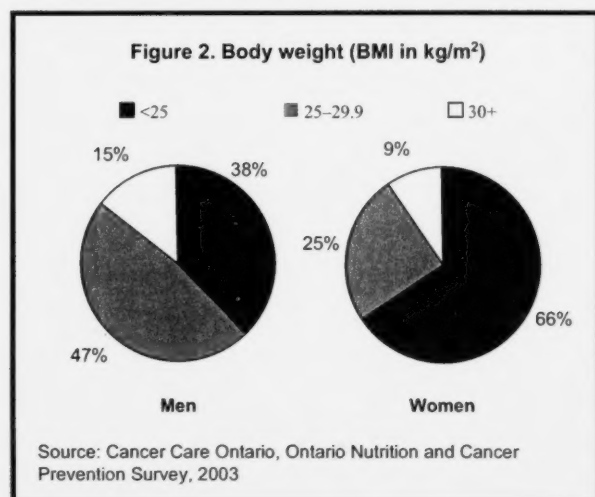
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(BMI $\geq$ 25) results in higher risk. A very low BMI (<18.5) increases the risk of other health problems and is not recommended.<sup>7,8</sup>

Almost half (48%) of Ontario adults aged 18–64 years were above the healthy weight range: 36% were overweight and 12% obese. Significantly more men than women were overweight or obese: 47% of men and 25% of women were overweight, and 15% and 9% of men and women, respectively, were obese (Figure 2).



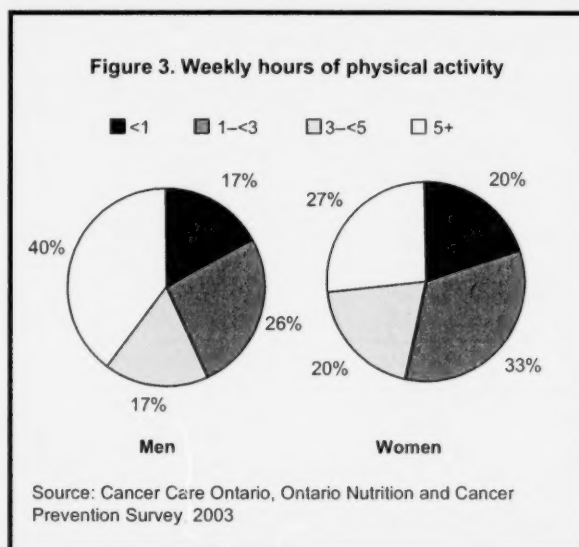
The International Agency for Research on Cancer recommends physical activity for energy balance and weight control.<sup>5</sup> The Agency suggests continuous moderate-intensity activity, such as walking, for an hour on most days, particularly among adults with sedentary jobs, to help maintain a healthy body weight.

### Physical activity

At least 30 to 45 minutes of moderate to vigorous physical activity on most days of the week is recommended to reduce cancer risk.<sup>3,9</sup> This represents three hours per week minimally and five hours optimally.

43% of men and 53% of women aged 18–64 did not meet the minimum recommendation, with less than three hours of moderate to vigorous physical activity per week; 60% of men and 73% of women did not meet the optimal recommendation of five hours per week (Figure 3). Nearly 20% were active for less than one hour per week.

Although moderate-intensity physical activity is adequate for weight control, vigorous activity, such as fast walking, several times per week may be needed for additional cancer-risk reduction.<sup>5</sup>



Canada's Physical Activity Guide to Healthy Active Living recommends that activities be performed in periods of at least 10 minutes each.<sup>10</sup> Whether more sustained activity is required for cancer-risk reduction is unknown.

### Conclusions and actions

Only 14% of Ontario men aged 18–64 and 22% of women meet minimum recommendations for vegetable and fruit intake (five or more servings daily), body weight (BMI <25 kg/m<sup>2</sup>) and physical activity (at least three hours weekly). 13% of men and 7% of women meet none of the three recommendations and are at increased risk of cancer as a result.

### Call to action!

Cancer is the leading cause of preventable death in Canada, responsible for 31% of potential years of life lost.<sup>11</sup> Unless action is taken to reduce the incidence of cancer, its burden on society and the health care system will continue to escalate.

Cancer Care Ontario, in consultation with its stakeholders, has set cancer prevention targets for the year 2020 (Table 3).<sup>12</sup> Intensive and sustained programs, policies and media messages will be needed to achieve the large changes in population behaviours required by these targets. These changes will also reduce the incidence of heart disease, diabetes, stroke, osteoporosis, and other chronic diseases.

It is critical that all stakeholders involved in cancer control take action.

**Table 3.****Ontario cancer prevention targets for diet, weight, physical activity and alcohol**

	Vegetable and Fruit Intake	Obesity	Physical Activity	Alcohol Consumption
Measure	% consuming 5+ servings of vegetables and fruit daily	% obese (BMI ≥ 30)	% participating in moderate to vigorous activity on most days of the week	% following the low-risk drinking guidelines*
Cancer 2020 Target	90%	10%	90%	98%

\* As set out by the CAMH<sup>13</sup>Source: Cancer 2020 Steering Committee<sup>12</sup>**For more information...**

The full text of *Insight on Cancer: News and Information on Nutrition and Cancer Prevention* can be found on both the Canadian Cancer Society's and Cancer Care Ontario's websites. Please visit the "library section" of the Ontario pages of the Canadian Cancer Society's website located at [www.cancer.ca](http://www.cancer.ca), or visit [www.cancercare.on.ca](http://www.cancercare.on.ca).

Dr. Marrett is a Scientist, Ms. Roberts is Manager of the Prevention Unit, and Mr. Innes is a Senior Research Associate, Division of Preventive Oncology, Cancer Care Ontario. Dr. Marrett is Associate Professor, Department of Public Health Sciences, University of Toronto.

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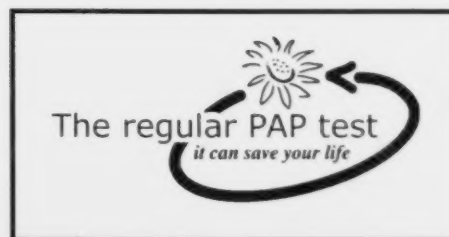
Loraine D. Marrett, PhD

Melody Roberts, RD MES

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**Table 3.**

**Ontario cancer prevention targets for diet, weight, physical activity and alcohol**

	Vegetable and Fruit Intake	Obesity	Physical Activity	Alcohol Consumption
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### SOURCE AND CONTACT

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# ENTERIC OUTBREAKS REPORTED IN ONTARIO, 2000-2002

## Introduction

Many bacterial, viral, and parasitic pathogens cause enteric outbreaks through oral-fecal transmission by vehicles of contaminated food or water, or by person-to-person exposures<sup>1</sup>. Previous summary articles for the periods 1994-1998 and 1999 reported that enteric outbreaks affected more than 10,000 individuals in Ontario annually<sup>2,3</sup>. These outbreaks were investigated by the local public health units in Ontario in accordance with the requirements and standards listed in the *Mandatory Health Programs and Services Guidelines* for infectious disease control<sup>4</sup>. The outbreak investigation data are collected by the health units and are entered into the outbreak module of the Reportable Disease Information System (RDIS) for the purpose of communicable disease surveillance. This report provides descriptive epidemiological findings of enteric outbreaks reported in RDIS from 2000 to 2002.

## Methods

The RDIS outbreak module was accessed on May 8<sup>th</sup>, 2003 to obtain records for the analysis. For the purpose of this report, an enteric outbreak was defined as two or more cases of enteric illness associated by time, exposure and/or place. "Episode Date" was used to estimate the onset date of the outbreak. This is the onset date of symptoms of the primary case, or if that was unknown, the earliest available date listed in the RDIS field "Type of Episode Date"<sup>5</sup>. The records in the module were included in the analysis if the

"Episode Date" was between January 1, 2000 to December 31, 2002.

The number of cases for each outbreak was given by the RDIS field "Epidemic curve-Total Ill" or was calculated by totalling "Staff-Actual ill" and "Clients-Actual ill". If there was a discrepancy between the two numbers, the greater of the two numbers was used as the number of cases for each outbreak.

Variables from RDIS fields "Mode of Transmission" and "Type of Establishment" were regrouped for the purpose of this analysis. The regrouped categories for "Mode of Transmission" include 'person-to-person' (person-to-person, direct contamination, and droplet transmission) and 'other' (wound contamination, indirect contamination, and animal contact). The regrouped categories for "Type of Establishment" include 'health care institutions' (health care facilities, hospitals, long-term-care facilities), 'school/day care institutions', 'food service sector' (cafeteria, club, fast food, hotel/motel, resort, and restaurant), and 'other' (catered event, church/religious centre, rest and retirement homes, and group homes).

The "Outbreak Agent/Organism" identified the agent or organism that caused the outbreak. The agent/organism was listed as 'other' if it was not available in the existing RDIS category list.

## Results

Over the study period, 1,881 outbreaks were reported in the RDIS outbreak module. Of these, 12 records were duplicates, 31 had less than 2 cases, and 258 did not specify

Table 1: Number and Percent of Missing or Unspecified Values by RDIS Field for Enteric Outbreaks Reported in Ontario, 2000-2002 (N=1,580)

RDIS Field Number	Field Name	Missing: number (%)		
		2000 (n=334)	2001 (n=452)	2002 (n=794)
20	Episode Date	0	0	0
100050	Outbreak Primary Health Unit	0	0	0
100440	Outbreak Agent/Organism	167 (50.0)	232 (51.3)	409 (51.5)
155	Outbreak Type of Establishment	25 (7.5)	14 (3.1)	20 (2.5)
240	Outbreak Mode of Transmission	22 (6.6)	10 (2.2)	35 (4.4)
100213	Epidemic curve-Total Ill	18 (5.4)	82 (18.4)	141 (17.8)
100312	Clients-Actual Ill	17 (5.1)	9 (2.0)	11 (1.4)
100313	Staff-Actual Ill	84 (25.1)	75 (16.6)	116 (14.6)
100314	Clients-Actual Number Hospitalized	49 (14.7)	55 (12.2)	149 (18.8)
100315	Staff-Actual Number Hospitalized	105 (31.4)	118 (26.1)	251 (31.6)
100316	Clients-Actual Number of Fatal Cases	55 (16.5)	62 (13.7)	155 (19.5)
100317	Staff-Actual Number of Fatal Cases	107 (32.0)	121 (26.8)	250 (31.5)

**Table 2: Annual Summary Statistics for Outbreaks and Cases, Ontario, 2000-2002.**

Statistic	Year		
	2000	2001	2002
Number of Outbreaks	334	452	794
Number of Cases	10,878	14,989	30,907
Mean (cases per outbreak)	33	33	39
Median (cases per outbreak)	15	22	22
Mode (cases per outbreak)	2	7	2
Range (cases per outbreak)	2-1,346	2-577	2-332
Hospitalization Rate per 1000 (# of hospitalized cases)	18 (197)	37 (557)	27 (835)
Case Fatality Rate per 1000 (# of deaths)	3.6 (39)	3.6 (50)	2.9 (75)

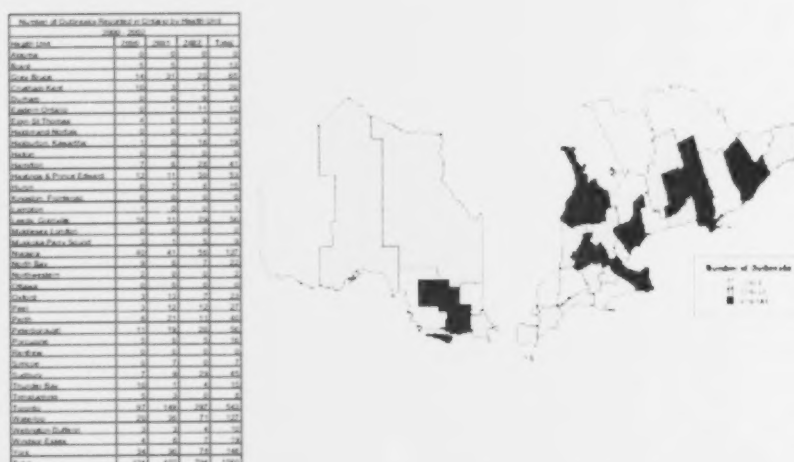
the number of cases. These records were excluded from the analysis. Therefore, 1,580 records met the case definition for an outbreak and were analyzed. The number and percentage of missing or unspecified values from the RDIS fields used in this report are listed in Table 1. The missing or unspecified values are not included in the following results.

A total of 56,774 individuals were affected in the 1,580 outbreaks. The mean, median, mode and range of the

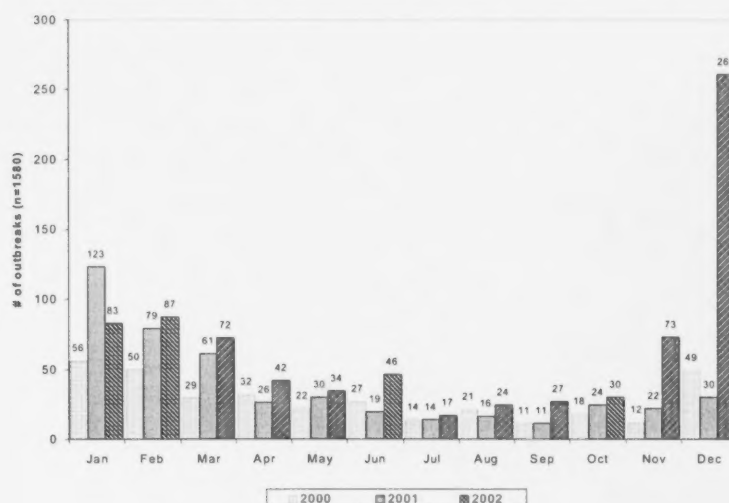
number of persons affected in the outbreaks for the study period were 36, 20, 2 and 2 - 1,346 respectively. The annual mean, median, mode, and range of the number of cases per outbreak as well as the hospitalization rate and the case fatality rate are listed in Table 2.

Enteric outbreaks were reported in 31 of the 37 Ontario health units (Figure 1). Sixty-two per cent of outbreaks were reported in the winter season (i.e., January to March and December). The number of outbreaks by month is

**Figure 1. Number of Enteric Outbreaks by Health Unit, Ontario, 2000-2002**



**Figure 2. Number of Enteric Outbreaks by Month, Ontario, 2000-2002**



The most frequently reported "Type of Establishment" during the study period was 'health care institutions'. 'Health care institutions' accounted for 62 per cent of outbreaks and 78 per cent of cases. The primary "Mode of Transmission"

was 'person-to-person' reported in 65 per cent of outbreaks and affected 72 per cent of individuals. The annual number of outbreaks and cases for "Type of Establishment" and "Mode of Transmission" are illustrated in Figure 3 and 4.

**Figure 3. Outbreaks and Cases by Type of Establishments, Ontario, 2000-2002.**

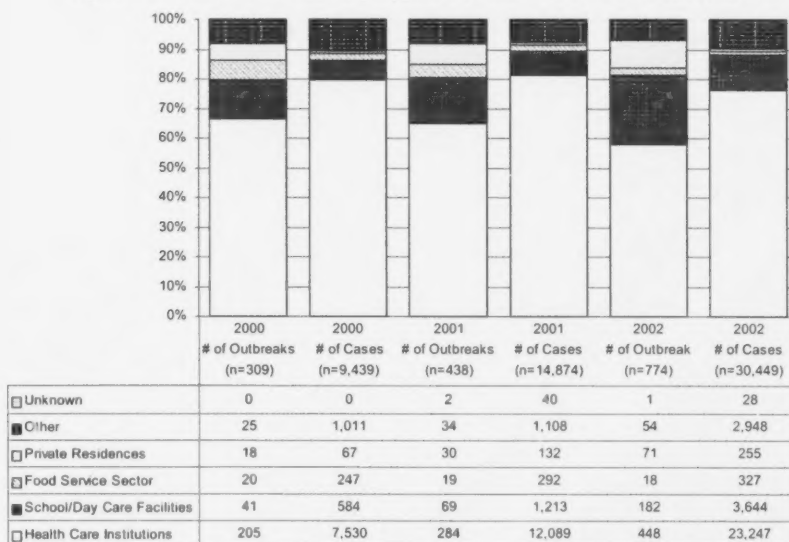
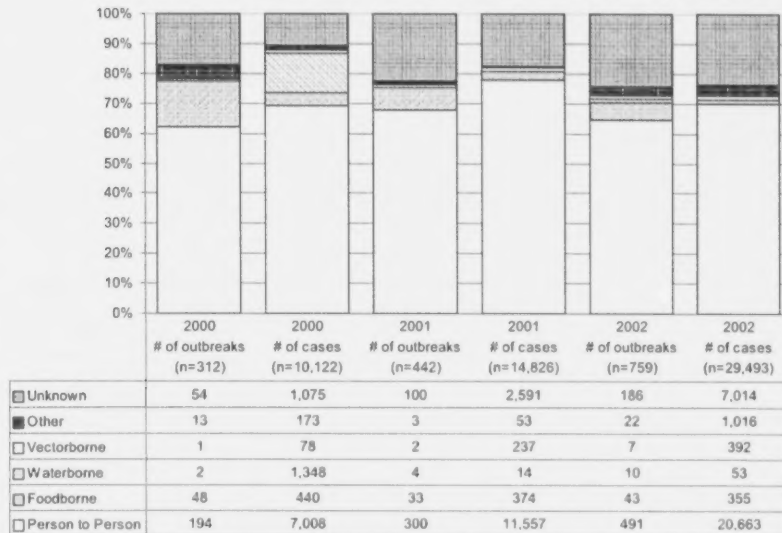


Figure 4. Outbreaks and Cases by Mode of Transmission, Ontario, 2000-2002



A total of 772 outbreaks reported the etiology of the outbreak. Viruses were identified in 416 outbreaks, followed in number by other (200), bacteria (125), parasites (29), and unknown (2). The most frequently reported viral, bacterial, and parasitic agent by number of outbreaks were Norwalk-like virus (NLV) (313), *Campylobacter* (46),

and *Giardia* (21). The most frequently reported viral, bacterial, and parasitic agent by number of cases affected in the outbreaks were Norwalk virus (17,827), *Escherichia Coli* (1,425), and *Cryptosporidium* (38). The annual number of enteric outbreaks and cases by type of agent/organism are listed in Table 3.

Table 3: Number of Outbreaks and Cases by Agent/Organism, Ontario, 2000-2002

Type of Agent/Organism		2000		2001		2002		Total	
		# of outbreaks	# of cases	# of outbreaks	# of cases	# of outbreaks	# of cases	# of outbreaks	# of cases
Viral	Astrovirus	4	77	2	38	3	87	9	202
	Calicivirus	4	42	5	226	7	255	16	523
	Enterovirus	1	11	6	178	3	73	10	262
	Hepatitis A	3	33	2	10	6	18	11	61
	Influenza virus	1	8	0	0	4	45	5	53
	Norwalk virus	53	2,831	87	4,352	173	10,644	313	17,827
	Parainfluenza	0	0	0	0	2	89	2	89
	Respiratory	0	0	0	0	1	47	1	47
	Rotavirus	16	355	22	677	11	463	49	1,495
	Total	82	3,357	124	5,481	210	11,721	416	20,559
Bacterial	Bacillus cereus	1	6	1	8	0	0	2	14
	Campylobacter	20	86	7	47	19	53	46	166
	Clostridium	3	167	5	92	3	87	11	346
	E. coli, verotoxin	5	1,370	9	33	6	22	20	1,425
	Salmonella (all serotypes)	4	8	10	86	16	131	30	225
	Shigella (all serotypes)	1	5	4	18	3	8	8	31
	Staphylococcus	0	0	1	2	1	21	2	23
	Yersinia enterocolitica	0	0	0	0	6	16	6	16
	Total	34	1,622	37	286	54	338	125	2,246
Parasitic	Cryptosporidium	3	23	1	13	1	2	5	38
	Giardia	5	20	6	16	10	24	21	60
	Entamoeba	0	0	1	2	2	8	3	10
	Total	8	43	8	31	13	34	29	108
Other	Other	41	1,044	51	1,659	108	3,788	200	6,491
Unknown	Unknown	2	31	0	0	0	0	2	31

## Discussion

Of the 1,881 reports entered in RDIS from 2000 to 2002, 289 records were not included in the analysis because either they did not meet the outbreak definition (31) or the numbers of cases were not specified for the outbreak (258). These may have been outbreaks but were not identified due to incomplete reporting on the true number of individuals affected by the outbreak. In addition, six health units did not report any outbreaks in the three-year period (Figure 1). It is likely that these health units did experience some enteric outbreaks but were not reported. Therefore, this report likely under-estimates the true number of enteric outbreaks in Ontario.

The 334 outbreaks reported in 2000 were comparable to the annual number of outbreaks reported from 1994 to 1999<sup>2,3</sup>. The annual number of outbreaks increased mildly to 452 outbreaks in 2001 and markedly to 794 outbreaks in 2002. The marked increase in the number of outbreaks was attributable to a large increase in the number of outbreaks that occurred in December 2002 (Figure 2). Further analysis of data reported in December 2002 indicated that 69 per cent of outbreaks in which an agent was identified were caused by NLV. These findings were consistent with reports of NLV outbreaks that occurred in hospitals, long-term care facilities, and schools throughout southern and eastern Ontario in December 2002<sup>6-9</sup>. Similarly, the 10,878 and 14,989 persons affected in 2000 and 2001, respectively, were comparable to the annual number of cases affected from 1994 to 1999 and the number increased to 30,907 persons affected in 2002<sup>2,3</sup>.

The rate of hospitalization, 18 and 27 cases hospitalized per 1,000 cases for 2000 and 2002 respectively, was comparable to the rate of 22 cases hospitalized per 1,000 cases in 1999<sup>3</sup>. In 2001, the rate increased moderately to 37 cases hospitalized per 1,000 cases. Forty per cent of the hospitalized cases in 2001 occurred in November in 'health care institutions'. Ninety-four per cent of these cases had gastroenteritis caused by 'other' type of organism.

The winter season accounted for 59 per cent of outbreaks in 2000, 74 per cent in 2001, and 73 per cent in 2002. The increase above the expected number of outbreaks (33%) that occurred in the winter months was attributed to the outbreaks occurring in health care facilities.

'Health care institutions' accounted for 62 per cent of outbreaks and 78 per cent of cases. Residents in institutional settings are often at increased risk of disease because of

factors such as pre-existing illness or old age that may compromise their ability to resist disease. Further, the residents often live in close proximity to each other increasing the risk of person-to-person transmission.

'Private residences' had a greater number of outbreaks (119) compared to the 'food service sector' (57). However, the number of persons affected in the 'food service sector' (866) was greater than the number of persons affected in the 'private residences' (454). A reporting bias likely affected these findings. Outbreaks occurring in 'private residences' were likely under-reported to a greater degree than outbreaks in the 'food service sector'.

Less than half of the outbreaks had known etiology. This is a common limitation in outbreak studies involving enteric diseases<sup>2,3,10-12</sup>. For the outbreaks with known etiology, common characteristics were identified for the etiologic agents with respect to the outbreaks. In general, viral outbreaks were reported to have occurred in the winter months (72%), occurred in 'health care institutions' (74%), had 'person-to-person' mode of transmission (87%), affected more than 50 individuals in each outbreak, and the virus most frequently identified was NLV (75%). Bacterial outbreaks occurred from August to November (46%), occurred in private residences (64%), had 'foodborne' mode of transmission (58%), and affected 2 to 10 individuals. Parasitic outbreaks occurred throughout the year, occurred in 'private residences' (81%), had 'person-to-person' (34%), 'unknown' (31%) or 'waterborne' (28%) modes of transmission and affected 2 to 10 individuals.

In a separate analysis of outbreaks with unknown etiology (808), it was found that 64 per cent of these outbreaks occurred in the winter, occurred in health care institutions (65%), and had 'person-to-person' mode of transmission (58%). Thus, the majority of these outbreaks had characteristics that were similar to viral outbreaks. It is suggested in many studies that NLVs are a major contributor to the number of unidentified agents in the outbreaks due to lack of sensitivity and specificity of laboratory testing for NLVs<sup>10-14</sup>. It is likely that many of the outbreaks with unknown or unspecified agents were NLVs but were not identified as such.

## Conclusion

The findings for enteric outbreaks in the period 2000 to 2002 were predominantly influenced by outbreaks caused



by viral agents that occurred in 'health care institutions' in the winter spread by 'person-to-person' transmission. The number of outbreaks increased markedly in 2002 due to a series of NLV outbreaks that occurred in December throughout southern and eastern Ontario. Caution must be exercised when interpreting the findings, however, because of incomplete reporting. □

## SOURCE

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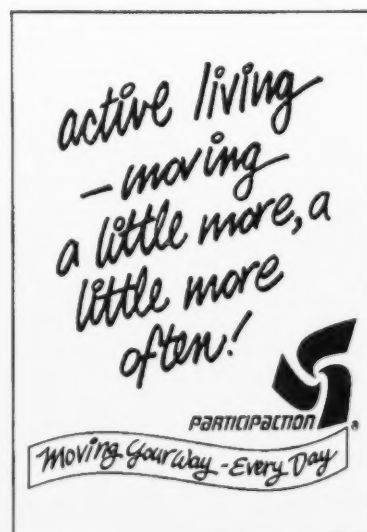
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# Summary of Reportable Diseases in Ontario - September, 2003

Health Units by Region	Population 2001	AIDS	Campylo.	Chicken-pox	Chlamydia	Enceph./ Meningitis	GAS	Gonorrhea
Algoma	117,200			5	30			
North Bay	92,950		2	4	14			1
Northwestern	75,085		1	4	10		1	
Porcupine	84,755				24			
Sudbury	188,365		5	1	29	2		
Thunder Bay	152,800		5		30	4		3
Timiskaming	35,335				7			
<b>Total - Northern</b>	<b>746,490</b>		<b>13</b>	<b>14</b>	<b>144</b>	<b>6</b>	<b>1</b>	<b>4</b>
Eastern Ontario	185,975		7		14			2
Hastings & Prince Edward	150,805		2	1	19	1		1
Kingston, Frontenac & Lennox	178,065		10		32	6		1
Leeds, Grenville & Lanark	159,100					1	1	
Ottawa	774,070		34	33	112	4		18
Renfrew	96,465		2	2	3			
<b>Total - Eastern</b>	<b>1,544,480</b>		<b>55</b>	<b>36</b>	<b>180</b>	<b>12</b>	<b>1</b>	<b>22</b>
Durham	506,900		18	11	74	1		11
Haliburton-Kawartha	161,770		6		18		1	1
Muskoka-Parry Sound	80,500		1		8	1		1
Peel	988,950		52	4	140	4	1	24
Peterborough	125,860		7	7	23			
Simcoe	377,030		7	43	33	3		4
Toronto - total	2,481,495	5	155	35	611	13	3	178
North		1	30	6	137	2	1	28
South		4	65	13	223	2	2	87
East			40	8	153	3		32
West			20	8	98	6		31
York	728,980		58	14	53	2	2	3
<b>Total - Central East</b>	<b>5,451,485</b>	<b>5</b>	<b>304</b>	<b>114</b>	<b>960</b>	<b>24</b>	<b>7</b>	<b>222</b>
Grey Bruce	152,380		7		3			
Elgin-St. Thomas	81,560		2	7	9			3
Huron	59,695		4	1	5			
Chatham-Kent	107,705		5	3	7			
Lambton	124,295							
Middlesex-London	403,180		10		51	3	1	17
Oxford	99,265		4		13	1		3
Perth	73,680		4		3			
Windsor-Essex	374,985		23		44	2	1	4
<b>Total - Southwest</b>	<b>1,476,745</b>		<b>59</b>	<b>11</b>	<b>135</b>	<b>6</b>	<b>2</b>	<b>27</b>
Brant	118,085		11		12			
Haldimand-Norfolk	104,580	1	4	2	4			1
Halton	375,230		22		33	1		3
Hamilton	490,270		9	6	92			19
Niagara	410,570		19	9	69	1	1	12
Waterloo	438,515		26		66	2		5
Wellington-Dufferin-Guelph	238,315		17	7	30		2	1
<b>Total - Central West</b>	<b>2,175,565</b>	<b>1</b>	<b>108</b>	<b>24</b>	<b>306</b>	<b>4</b>	<b>3</b>	<b>41</b>
<b>September 2003</b>	<b>11,394,765</b>	<b>6</b>	<b>539</b>	<b>199</b>	<b>1,725</b>	<b>52</b>	<b>14</b>	<b>316</b>
<b>* Total YTD 2003</b>	<b>-</b>	<b>69</b>	<b>3,112</b>	<b>10,412</b>	<b>13,617</b>	<b>312</b>	<b>315</b>	<b>2,418</b>
<b>* Total YTD 2002</b>	<b>-</b>	<b>91</b>	<b>3,619</b>	<b>12,271</b>	<b>13,566</b>	<b>721</b>	<b>276</b>	<b>2,279</b>

The Toronto City regions above are now defined as: North - former North York; South - former City of Toronto; West - former Etobicoke and City of York; East - former Scarborough and East York

\*\* Infectious Syphilis cases include 'Primary, Secondary and Early Latent' staging effective January 1, 2003

\* Adjusted for deletions and late reports.

## Summary of Reportable Diseases in Ontario - September, 2003

Health Units by Region	Population 2001	Hepatitis A	Hepatitis B	Hepatitis C	Hib	Influenza	Measles	Meningo- coccal
Algoma	117,200		1	7				
North Bay	92,950			4				
Northwestern	75,085			3				
Porcupine	84,755			1				
Sudbury	188,365			9				
Thunder Bay	152,800			9				1
Timiskaming	35,335			1				
<b>Total - Northern</b>	<b>746,490</b>		<b>1</b>	<b>34</b>				<b>1</b>
Eastern Ontario	185,975		1	3				
Hastings & Prince Edward	150,805	1		1				
Kingston, Frontenac & Lennox	178,065			16				
Leeds, Grenville & Lanark	159,100			1				1
Ottawa	774,070			31				1
Renfrew	96,465							
<b>Total - Eastern</b>	<b>1,544,480</b>	<b>1</b>	<b>1</b>	<b>52</b>				<b>2</b>
Durham	506,900							
Haliburton-Kawartha	161,770			4				
Muskoka-Parry Sound	80,500							
Peel	988,950	5		2				
Peterborough	125,860		3	7	1			
Simcoe	377,030			25				
Toronto - total	2,481,495	7	3	113		1		1
North				25				
South		5	1	45				1
East		1	1	29				
West		1	1	14		1		
York	728,980	3	2	10		1		
<b>Total - Central East</b>	<b>5,451,485</b>	<b>15</b>	<b>8</b>	<b>161</b>	<b>1</b>	<b>2</b>		<b>1</b>
Grey Bruce	152,380		1	6				
Elgin-St. Thomas	81,560		1	2				
Huron	59,695			1				
Chatham-Kent	107,705			3				
Lambton	124,295							
Middlesex-London	403,180	2	1	22				
Oxford	99,265			3				
Perth	73,680							
Windsor-Essex	374,985			17				
<b>Total - Southwest</b>	<b>1,476,745</b>	<b>2</b>	<b>3</b>	<b>54</b>				
Brant	118,085			1				
Haldimand-Norfolk	104,580		1					
Halton	375,230			8				
Hamilton	490,270	2	1	25				
Niagara	410,570	4		35				
Waterloo	438,515	1		11				
Wellington-Dufferin-Guelph	238,315	1		1				
<b>Total - Central West</b>	<b>2,175,565</b>	<b>8</b>	<b>2</b>	<b>81</b>				
<b>September 2003</b>	<b>11,394,765</b>	<b>26</b>	<b>15</b>	<b>382</b>	<b>1</b>	<b>2</b>		<b>4</b>
<b>* Total YTD 2003</b>	<b>-</b>	<b>109</b>	<b>97</b>	<b>3,647</b>	<b>11</b>	<b>455</b>	<b>9</b>	<b>38</b>
<b>* Total YTD 2002</b>	<b>-</b>	<b>115</b>	<b>101</b>	<b>3,899</b>	<b>3</b>	<b>2,177</b>		<b>44</b>

The Toronto City regions above are now defined as: North - former North York; South - former City of Toronto; West - former Etobicoke and City of York; East - former Scarborough and East York

\*\* Infectious Syphilis cases include 'Primary, Secondary and Early Latent' staging effective January 1, 2003

\* Adjusted for deletions and late reports.

## Summary of Reportable Diseases in Ontario - September, 2003

Health Units by Region	Population 2001	Mumps	Pertussis	Rubella	Salmon.	Shigellosis	Syphilis Infectious**	TB	VTEC
Algoma	117,200								
North Bay	92,950								
Northwestern	75,085				1				
Porcupine	84,755								
Sudbury	188,365		6						
Thunder Bay	152,800				2				
Timiskaming	35,335								
<b>Total - Northern</b>	<b>746,490</b>		<b>6</b>		<b>3</b>				
Eastern Ontario	185,975				2				
Hastings & Prince Edward	150,805				4	1			
Kingston, Frontenac & Lennox	178,065				3				1
Leeds, Grenville & Lanark	159,100		1		1				
Ottawa	774,070		5		8	2			1
Renfrew	96,465				2				
<b>Total - Eastern</b>	<b>1,544,480</b>		<b>6</b>		<b>20</b>	<b>3</b>			<b>2</b>
Durham	506,900		4		7	1			2
Haliburton-Kawartha	161,770		1		2				1
Muskoka-Parry Sound	80,500				3			1	
Peel	988,950				31	3		5	4
Peterborough	125,860		3		2		1		
Simcoe	377,030								
Toronto - total	2,481,495		5		75	6	16	13	3
North					19	1	2	3	1
South			1		22	4	12	3	1
East			4		19	1	1	7	1
West					15		1		
York	728,980		1		26	1		2	3
<b>Total - Central East</b>	<b>5,451,485</b>		<b>14</b>		<b>146</b>	<b>11</b>	<b>17</b>	<b>21</b>	<b>13</b>
Grey Bruce	152,380				2			1	2
Elgin-St. Thomas	81,560				3	1			
Huron	59,695					1			5
Chatham-Kent	107,705								
Lambton	124,295								
Middlesex-London	403,180		1		2				
Oxford	99,265				3				
Perth	73,680				3				1
Windsor-Essex	374,985				3				2
<b>Total - Southwest</b>	<b>1,476,745</b>		<b>1</b>		<b>16</b>	<b>2</b>		<b>1</b>	<b>10</b>
Brant	118,085				1				1
Haldimand-Norfolk	104,580								2
Halton	375,230		1		5	1		1	2
Hamilton	490,270		1		7	2		2	
Niagara	410,570				6			1	
Waterloo	438,515		1		7			3	3
Wellington-Dufferin-Guelph	238,315				2				1
<b>Total - Central West</b>	<b>2,175,565</b>		<b>3</b>		<b>28</b>	<b>3</b>		<b>7</b>	<b>9</b>
<b>September 2003</b>	<b>11,394,765</b>		<b>30</b>		<b>213</b>	<b>19</b>	<b>17</b>	<b>29</b>	<b>34</b>
<b>* Total YTD 2003</b>	<b>-</b>	<b>11</b>	<b>233</b>	<b>7</b>	<b>1,575</b>	<b>206</b>	<b>241</b>	<b>421</b>	<b>394</b>
<b>* Total YTD 2002</b>	<b>-</b>	<b>11</b>	<b>383</b>	<b>2</b>	<b>1,891</b>	<b>772</b>	<b>124</b>	<b>542</b>	<b>302</b>

The Toronto City regions above are now defined as: North - former North York; South - former City of Toronto; West - former Etobicoke and City of York; East - former Scarborough and East York.

\*\* Infectious Syphilis cases include 'Primary, Secondary and Early Latent' staging effective January 1, 2003

\* Adjusted for deletions and late reports.